THESE HISTOGRAMS GRAPHICALLY ILLUSTRATE THE FREQUENCY AND ABUNDANCE OF MOLYBDENUM CONCENTRATIONS REPORTED BY HESSIN AND OTHERS (1978); EAKINS (1968)

MOLYBDENUM

Mode 1-2 Wood River Lakes Area (Eakins, 1968, fig.7)

Anomalous over 5 ppm

(BY ATOMIC ABSORPTION ANALYSES)

PERCENTILE

95 97

PARTS PER MILLION

EXPLANATION OF ABUNDANCE SYMBOLS

REPRESENTS CONCENTRATIONS OF TIN

FROM 20 - 99 PARTS PER MILLION

REPRESENTS CONCENTRATIONS OF TIN

GREATER THAN 100 PARTS PER MILLION

REPRESENTS CONCENTRATIONS OF TUNGSTEN FROM 100 - 499 PARTS PER MILLION

REPRESENTS CONCENTRATIONS OF TUNGSTEN GREATER THAN 500 PARTS PER MILLION

(AREA OF REPORT: Barnes and others, 1978)

AREA OF REPORT: CLARK, GRYBECK. GREENWOOD and others, 1978

CLARK, GRYBECK, HESSIN and others, 1978

GEOCHEMICAL AND GENERALIZED GEOLOGICAL MAP SHOWING DISTRIBUTION AND ABUNDANCE OF MOLYBDENUM, TIN, AND TUNGSTEN

IN THE GOODNEWS AND HAGEMEISTER ISLAND QUADRANGLES REGION, SOUTHWESTERN ALASKA

T.D. HESSIN, P. M. TAUFEN, J. C. SEWARD, S. J. QUINTANA, A. L. CLARK, DONALD GRYBECK, J. M. HOARE, AND W. L. COONRAD

information to accompany folio of geologic, geochemical, geophysical, and mineral resource maps of the Goodnews and Hagemeister Island quadrangles region, southwestern Alaska: U.S. Geol. Survey Open-file Rept. 78-9. Overstreet. W. C., Hamilton, J. C., Boerngen, J. G., Rosenblum, Sam, Marsh, W. R., and Sainsbury, C. L., 1973, Minor elements in non-magnetic concentrates from Alaska: U.S. Geol. Survey open-file rept., 440 p. (also available NTIS (1975) PB-238 989/AS, 440 p.) BAIRD INLET (B) BETHEL KUSKOKWIM BAY (B) GOODNEWS (C) Cape Constantine BASE MAP INDEX Base compiled from U.S. Geological Survey 1:63,360 (A) and 1:250,000 (B) scale topographic series 1952-1957 and advance field completion material (C) 1976 by Menlo Park Base Map Section SCALE 1:250 000 DECLINATION, 1976 CONTOUR INTERVALS 50, 100, AND 200 FEET DATUM IS MEAN SEA LEVEL

R 61 W Kikertalik 203 o

FOLIO OF THE GOODNEWS AND HAGEMEISTER ISLAND QUADRANGLES REGION OPEN FILE REPORT 78-9-Q

EXPLANATION

GEOLOGY GENERALIZED FROM HOARE AND COONRAD (1978)

CORRELATION OF MAP UNITS

Qu ) QUATERNARY INTRUSIVE ROCKS

Tif Tim Tn TERTIARY

PRE-CAMBRIAN

DESCRIPTION OF MAP UNITS

Qu UNCONSOLIDATED SEDIMENTARY DEPOSITS

SEDIMENTARY, VOLCANIC, AND METAMORPHIC ROCKS

SEMICONSOLIDATED MARINE BEACH SEDIMENTS VOLCANIC ROCKS AND VOLCANOGENIC SEDIMENTS - Chiefly andesitic flows and tuffs SUMMIT ISLAND FORMATION - Nonmarine conglomerate, sandstone, shale, and carbonaceous mudstone

ВИСНІА RIDGE GRAYWACKE - Chiefly interbedded calcareous graywacke, siltstone, and conglomerate with local coquinas of Buchia shells Kig LIMY GRIT AND LIMESTONE - Chiefly angular grit cemented by bioclastic limestone TUFFS AND SEDIMENTARY ROCKS - Varied assemblage of andesitic tuffs, graywacke, siltstone, impure limestone, and tuffaceous chert; fuff and tuffaceous sediments commonly laumontitized Kog GRAYWACKE AND CONGLOMERATE - Marine graywacke, siltstone, and conglomerate; commonly calcareous

VOLCANIC AND SEDIMENTARY ROCKS - Interbedded intermediate to mafic flows, tuffs, tuffaceous sedimentary rocks, and argillite; intermediate composition tuffaceous rocks commonly laumontitized JK KULUKAK GRAYWACKE - Chiefly very hard lithic graywacke and siltstone with local conglomerate Jvs VOLCANIC AND SEDIMENTARY ROCKS - Andesitic, trachytic, and basaltic flows and breccias interbedded with volcanogenic sedimentary rocks JIVS VOLCANIC AND SEDIMENTARY ROCKS - Mafic flows and breccias interbedded with volcanogenic sedimentary rocks; fractures commonly coated with laumontite

MESOZOIC AND PALEOZOIC ROCKS UNDIVIDED - Widespread marine unit including mafic to intermediate volcanic rocks, tuffaceous sedimentary rocks, chert, argillite, siltstone, graywacke, conglomerate, and limestone YOLCANIC AND SEDIMENTARY ROCKS (Upper Triassic) - Locally differentiated marine unit of chert, tuffaceous cherty rocks, argillite, siltstone, wackes, conglomerate, limestone, and mafic flows and breccia Pv VOLCANIC ROCKS (Permian) - Locally differentiated marine unit of pillow basalts, massive mafic flows, breccia, and tuff

DOI LIMESTONE - Thin-bedded to massive limestone with minor interbedded tuff and mafic flows; locally recrystallized to marble with interbedded quartzite and quartz-chlorite schist PSK KANEKTOK METAMORPHIC COMPLEX - Gneiss, schist, amphibolite, and marble; upper greenschist to lower amphibolite facies

p€I MARBLEIZED LIMESTONE - Locally differentiated

MAFIC INTRUSIVE ROCKS - Diabase, basalt, dioritic, and gabbroic dikes and sills locally mapped NAROGARUM COMPLEX - Quartz-rich porphyritic felsite intrusive-extrusive complex of dikes, sills, tuff, and GRANITIC ROCKS - Chiefly quartz monzonite, granodiorite, and quartz diorite stocks

ULTRAMAFIC ROCKS - Serpentinite, dunite, and websterite TRONDHJEMITE - Associated with serpentinite and gabbro METAGABBRO AND GREENSTONE - Probable dismembered ophiolite complex of mafic flows, dikes, volcanoclastic rocks, and gabbro altered by greenschist facies metamorphism and calcium metasomatism

GEOLOGIC SYMBOLS

Contact. Known, approximately located, gradational, and inferred. Most contacts between bedded rock units are probably faults Fault or fault zone. Dashed where approximately located, inferred, or concealed Thrust fault. Dashed where approximately located, inferred, or concealed. Sawteeth on upper plate

GEOCHEMICAL SYMBOLS

RED MOUNTAIN ULTRAMAFIC BODY RED MOUNTAIN CONTACT ZONE

GEOCHEMICAL SAMPLE SITES ROCK (CLARK, GRYBECK, GREENWOOD, AND OTHERS, 1978;

COONRAD, AND OTHERS, 1978)

★ CONCENTRATE (OVERSTREET, AND OTHERS, 1973)

OFFSHORE AND ONSHORE SEDIMENTS (BARNES, AND

• BEACH AND STREAM SEDIMENTS (BERRYHILL, 1963)

STREAM DRAINAGE SEDIMENT (HESSIN, AND OTHERS, 1978)

 STREAM DRAINAGE SEDIMENT (CLARK, GRYBECK, HESSIN, AND OTHERS, 1978)

STREAM DRAINAGE SEDIMENT (EAKINS, 1968, 1969)

▼20 NUMBER WITH SOLID ROCK SAMPLE-SITE SYMBOL REPRESENTS GEOCHEMICAL CONCENTRATION OF MOLYBDENUM IN

PARTS PER MILLION (PPM) SOLID STREAM-DRAINAGE SAMPLE-SITE SYMBOL INDICATES GEOCHEMICAL ABUNDANCE OF 90TH PERCENTILE VALUE OR GREATER IN TWO OR MORE

ABUNDANCE SYMBOLS REPRESENTING 95TH PERCENTILE △ OR GREATER CONCENTRATIONS DETERMINED IN O STREAM-DRAINAGE SITE SAMPLES ARE SHOWN WITH

DISCUSSION OF GEOCHEMISTRY

THIS REPORT SHOWS THE DISTRIBUTION AND ABUNDANCE OF MOLYBDENUM, TIN, AND TUNGSTEN AS GEOCHEMICALLY DETERMINED IN VARIOUS SAMPLE MEDIA COLLECTED FROM LOCATIONS THROUGHOUT THE GOODNEWS AND HAGEMEISTER ISLAND QUADRANGLES REGION. DATA PRESENTED HAVE BEEN COMPILED FROM ANALYSES AND LOCATIONS REPORTED BY CLARK, GRYBECK, GREENWOOD, AND OTHERS (1978); CLARK, GRYBECK, HESSIN, AND OTHERS (1978); COONRAD AND OTHERS (1978); EAKINS (1968); HESSIN AND OTHERS (1978); AND

MOLYBDENUM. -- THE INCLUDED HISTOGRAMS HAVE BEEN USED TO IDENTIFY STREAM-DRAINAGE SAMPLES THAT CONTAIN CONCENTRATIONS OF MOLYBDENUM THAT MIGHT BE ANOMALOUS. THE AMOUNT OF MOLYBDENUM DETECTED IN ROCK SAMPLES IS INDICATED BY A NUMBER SHOWING CONCENTRATION IN PARTS PER

TIN AND TUNGSTEN. -- THE LOWER LIMITS OF THE SYMBOLIZED VALUES OF BOTH TIN AND TUNGSTEN WERE ARBITRARILY SELECTED FROM A SMALL SAMPLE POPULATION OF STREAM-DRAINAGE SAMPLES SHOWING DETECTABLE CONCENTRATIONS. THE FEW ROCK SAMPLES IN WHICH TIN OR TUNGSTEN WERE DETECTED HAVE THE CONCENTRATION SHOWN IN PARTS PER MILLION. THE GENERALIZED GEOLOGIC MAP DATA INCLUDED IN THIS REPORT AND THE

MORE DETAILED GEOLOGIC MAP OF THE REGION (HOARE AND COONRAD, 1978) SHOULD BE UTILIZED IN CONSIDERING POSSIBLE SIGNIFICANCE OF THE MOLYBDENUM, TIN, AND TUNGSTEN THAT HAS BEEN GEOCHEMICALLY DETECTED

> BACKGROUND INFORMATION RELATING TO THIS REPORT IS PUBLISHED AS (AVAILABLE FROM THE SAME SOURCE AS THE MAP) This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature.